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## **The lack of correlation between radiographic findings and cartilage integrity.**

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### **Abstract**

Total knee arthroplasty is a common treatment of osteoarthritis, although unicompartmental knee arthroplasties are frequently used to retain unaffected compartments. Joint space width (JSW) is a major factor in determining treatment. We examined the relationship between JSW and cartilage quality in 60 patients undergoing total knee arthroplasty to assess its accuracy in representing cartilage degradation. Radiographic JSW was recorded, whereas the unaffected compartment of each tibial plateau was examined postoperatively using Collins, Mankin, and Kellgren and Lawrence scores. No correlation was seen between visual or histologic grading and JSW. Histology more accurately represented cartilage quality, yet it is impractical to obtain preoperatively; thus, JSW is the main mode of assessment. However, using JSW solely to indicate unicompartmental knee arthroplasty may overlook disease in apparently unaffected compartments.

# Objective

- Investigate the relationship between radiographic JSW and cartilage quality
- Hypothesis: JSW is not an accurate indicator of the severity of cartilage damage in cases of OA of the knee

# Materials and Methods

- Prospective study
- 60 patients
- TKA for idiopathic OA
- One orthopedic surgeon
- Mean age 69 years (48-87)
- 45 varus / 15 valgus
- 35 left / 25 right
- AP and lateral view radiographs

# Materials and Methods

- Variables
  - Collins Grading (gross tibial plateau image)
    - Score from 1 to 4
  - Mankin Grading (fresh core samples 5mm)
    - Score from 0 to 12
    - Samples were taken from the non affected side
  - JSW Measurement (measure medial and lateral side)
    - 5mm or more considered normal
  - Kellgren and Lawrence
    - Score from 1 to 4

# Statistics

- SPSS
- $X^2$  (Collins vs JSW and KL vs Collins)
- Spearman rank (Mankin vs Collins)
- $P < 0,05$

# Results

- Valgus cases (5/15 with grade III Collins)
  - Average medial JSW 3,1mm
  - Average in grade II Collins 4,0mm
  - Average KL 2,4
- Varus cases (12/45 with grade III Collins)
  - Average lateral JSW 5,3mm
  - Average in grade II Collins 5,5mm
  - Average KL 1,4

# Results

- No significant statistical correlation JSW/Collins, KL/Collins
- Varus knees with degraded contralateral compartments maintained JSW more than valgus knees
- Collins is correlated with Mankin (0,885  $p < 0,01$ )
- Poor cartilage quality can be found in normal JSW

# Discussion

- Radiographic JSW is not an accurate indicator of cartilage quality
- Correlation between Collins and Mankin
  - Impossible to obtain pre-op
  - Degeneration macro and micro not with Xrays
- When deciding UKA, more future revisions
- Older patients more arthritic progression, but
  - Younger than 65: Mankin 8,7
  - Older than 65: Mankin 4,4

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# Discussion

- **Xrays at 45° of flexion**
  - Further studies investigate relationship between radiographic views and cartilage integrity
- Sex affect JSW (men wider space / women perimenopausal decrease JSW)
- Increasing age, decreasing JSW
- Height and weight, negative correlation with JSW (> valgus knees)
  - Weight gain no correlated with joint space narrowing

# Discussion

- Race may influence in OA
- **Conclusions may be applicable to HTO**
  - Surgeons must evaluate intra-op to decide
- No histologic or RNM examination
  - Increasing cost and morbidity
- Patients younger than 65 and with varus knees: JSW is not correlated with degradation